AFTAC

Air Force Technical Applications Center

RADIONUCLIDE SITE SURVEY REPORT ASHLAND, KANSAS (RN-74)

Frank Walker
John Lucas
Marv Owen
TSgt Earl Maurice McKethan
SSgt Jason Macartney

7 January 1999

Prepared for:
Provisional Technical Secretariat
Comprehensive Test Ban Treaty Organization

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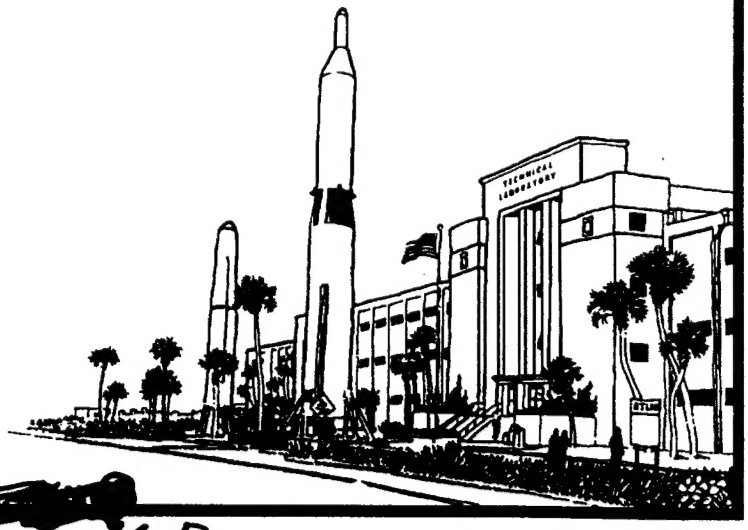

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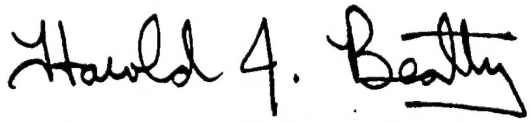

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Frank Walker, John Lucas, Marv Owen, Maurice McKethan, Jason Macartney
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13. ABSTRACT *(Maximum 200 words)*

The purpose of this report is to validate that the Ashland, Kansas site will fulfill treaty requirements as set forth by the Preparatory Commission for the Comprehensive Test Ban Treaty Organization.

The team performing the site survey followed accepted scientific methods in collecting air and soil samples near the proposed site. The samples were analyzed by the McClellan Central Laboratory and the results forwarded to AFTAC/TM for review. The team included meteorological and technical staff. Possible sources of radionuclides were examined, as well as meteorological conditions that might affect the validity of recorded data at the site. All necessary background information required by the Commission was researched and is included in the report.

The analysis of the samples identifies all radionuclide isotopes and their sources that might affect future samples at the site. There are no significant findings that would prevent this site from meeting treaty requirements.

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RADIONUCLIDE SITE SURVEY REPORT

RN-74

Introduction

Ashland, Kansas, USA, is listed in the Comprehensive Test Ban Treaty (CTBT) as the location for an International Monitoring System (IMS) radionuclide detection system. This site is located on the grounds of Ashland Krier Field in Ashland, Kansas. The purpose of this report is to validate that the Ashland site will fulfill the requirements for treaty compliance.

Site Survey Guidance

The format and content of this report are based on guidance provided by the Preparatory Commission for the CTBT Organization for conducting and documenting radionuclide site surveys (see CTBT/PC/IV/WGB/1, "Requirements of Site Surveys for Radionuclide Stations," 30 September 1997).

1. General Information

a. CTBT Treaty Location Coordinates: 37.16°N/99.77°W
b. Proposed Location: 37°09′36″N/99°46′12″W
c. Altitude: The site elevation is 600 meters above Mean Sea Level (MSL).
d. Locality: The site is located in the city of Ashland in Clark County.
e. Province: The site is located in the state of Kansas.
f. Airports: There are two airports near the site as shown in Table 1. The closest airport is Ashland Krier Field, which is located almost coincident with the site. It is used mainly by local crop dusters and air traffic is minimal. Access is limited to light aircraft. The nearest commercial airfield giving access to the site is at Dodge City, located 65 km to the north.

Table 1: Local Airports

AIRPORT	DISTANCE FROM SITE	DIRECTION FROM SITE
Ashland Krier	1 km	west
Dodge City	65 km	north

g. Seaports: There are no seaports near the site.
h. Rail Station: There is no local rail access to the site. The nearest rail line is located at Dodge City, 65 km to the north.
i. Local Access: A paved, two lane road is adjacent to the site. State Highway Route 160 runs east-west 10 km north of the site, leading to connections with the national interstate highway system, which is within 180 km north of the site.

j. Best and most cost effective way for transporting heavy equipment: The most cost-effective means of transporting equipment is by commercial highway carrier.
k. Best and most cost effective way for people to access the station location: The closest commercial airport is located 65 km to the north at Dodge City.
l. Description: The site is located on level, open prairie on the grounds of the Ashland Krier Airport. The sampler will be housed in a pre-fabricated building with an intrusion detection system.
m. Type of terrain: The proposed site location is described as flat, open plains.
n. Located in valley/depression: The site is not located in a valley or depression.
o. Grade: N/A
p. Person in charge of the site survey:

Name: John Lucas
Organization: AFTAC
Address: 1030 S. A1A
Patrick AFB, FL 32925-3002
Phone: (407) 494-7594
Fax: (407) 494-5460
E-mail: johnl@aftac.gov

2. Narrative Site Description

The site will be located on the grounds of the Ashland Krier Field under the auspices of Ashland City Hall. The city will provide operator support to the CTBT equipment. The proposed site is located approximately 3 kilometers from the treaty coordinates and is situated on an open plot of land (approximately 30 meters by 90 meters) at the corner of Grant St. and the airport entry road, south of the city. The airport is located on flat, open land with no obstructions to the wind. Two airport hangars are located approximately 120 meters to the west of the proposed site. There are a few anhydrous ammonia tanks approximately 60 meters directly south of the proposed site. The prevailing winds are from the south. The climate of southwestern Kansas is classified as semi-arid.

3. Available buildings and land for hosting the radionuclide station

The city mayor and the town council have given their approval to host a CTBT Radionuclide Sampling Station. A pre-fabricated equipment shelter will be located on the grounds to house the air sampling equipment. Suitable electrical and phone service is available.

4. Operational Information

a. Responsible Agency: City Hall, Ashland, Kansas
b. Address: Ashland City Hall
703 Main Street
Ashland, Kansas 67831
c. Technical contact:
(1) Name: Mr. Doug Graf
(2) Address: Ashland City Hall

703 Main Street
Ashland, Kansas 67831
(3) Phone: (316) 635-2205
(4) Fax: (316) 635-2944
(5) E-mail: None

d. Is the site shared with other organizations or used for additional purposes? The local airport supports a small general aviation population. The site itself, with the equipment shelter, will not be used by any other agency.

e. Spare parts availability:

Spares at site: No spares are located at the site.

Time to replace parts: DME Corporation is the maintenance contractor. The contract calls for replacement of defective equipment within 24 hours.

5. Existing station infrastructure (manufacturer of each component)

This is a new station. No infrastructure existed prior to the site survey and subsequent equipment installation.

6. Installing preferences for upgrading or for a new station

a. Type of operation: The proposed station will have automatic operation.

b. Type of system:

(1) Air Sampler: The proposed station would employ a Radionuclide Aerosol Sampler (RASA) manufactured by DME Corporation of Orlando, Florida.

(2) Measuring system:

(a) Detector: The detector is a high purity germanium detector.

(b) Electronics: The electronics package is a DSPEC digital spectrometer manufactured by EG&G.

(c) Software: The software is US government-provided software.

c. Preferences or needs concerning the housing of the station: There are no other needs concerning the housing of the station.

d. Other preferences: N/A

7. Meteorological Information

a. General climate description:

The climate of southwestern Kansas is classified as semi-arid. The Rocky Mountains form a barricade against all moisture from the southwest, west and northwest, except high level moisture. Chinook winds occur occasionally but with less effect than at stations farther to the west. Relatively dry air predominates with an abundance of sunshine, contributing to broad diurnal temperature ranges.

Thunderstorms throughout the spring and summer contribute most of the moisture. Thunderstorms are widely scattered, occurring during the late afternoon and evenings. Hail and strong winds accompany the thunderstorms, with occasional tornado activity. Winter is the dry season. Snow cover is generally brief due to mild temperatures and an

abundance of sunshine. There are occasional blizzards spreading from the flat treeless prairies of the high plains.

b. Average annual rainfall: The average annual rainfall is 52.3 cm.

c. Maximum rain precipitation per 24 hours: The maximum recorded rain precipitation per 24 hours was 10.4 cm and occurred in the month of October.

d. Snowfall: The mean annual snowfall is 50.8 cm. Snowfall occurs with trace amounts beginning in September through May. Heaviest periods of snowfall are in the months of November through April.

e. Prevailing wind direction: The prevailing wind direction is from the south.

f. Maximum wind speed: The maximum recorded wind speeds are 71 knots.

g. Min/Max temperature and annual average temperature: The minimum temperature recorded was -29°C in the month of December. The maximum temperature recorded was 43°C in the month of July. The annual average temperature is 13°C.

h. Nearby large bodies of water: The Arkansas River runs east /west 50 km north of the site. There are two creeks approximately 25 km east and west of the site, and numerous other small creeks within 50 km.

i. Nearby mountain ranges: The Rocky Mountains are approximately 400 km to the west of Ashland.

j. Nearby population centers: The city of Ashland is located 10 km from the proposed site and has a population of approximately 1,000 people. Dodge City is located 65 km north of the site and has a population of approximately 21,000.

k. Industrial pollution: The industrial pollution is indexed as less than 50 out of 500 on the Environmental Protection Agency Pollution Standards Index (PSI). A level at or below 100 indicates that a pollutant reading is in the satisfactory range. The pollutants indexed by the PSI are called "criteria pollutants." They are pollutants for which science-based health criteria are used to determine the allowable ambient (outdoor) air concentrations. The EPA regulates the criteria pollutants because of their impact on human health and the environment. They are:

Carbon monoxide (CO) Ground-level ozone (O_3) Lead (Pb) Nitrogen dioxide (NO_2) Particulate matter (PM_{10}) Sulfur dioxide (SO_2)	The standards or allowable concentrations for these six pollutants are known as National Ambient Air Quality Standards (NAAQS).

The main measured pollutant was particulate matter.

l. Nearby weather station: The National Weather Service station at Dodge City, Kansas, is located 65 km north from the proposed site.

m. Person or institution that provided meteorological report:

Name: SSgt Jason Macartney, Staff Meteorologist, AFTAC/TMSW
Address: 1030 S. Highway A1A, Patrick AFB, FL 32925-3002
Phone: (407) 494-7933
Fax: (407) 494-5450

n. Date of this report: July 15, 1998

o. Description of local microclimate situation: The microclimate conditions are described as semi-arid plains.
p. Recency of above data: This report used hourly weather observations from January 1948 - December 1995. Pollution index data were measured from January through December 1997.

8. Safety

a. Natural hazards: The natural hazards in Table 2 reflect the associated risk level to the station (risk level: non-existent, very low, medium, high, very high). Tornadoes are the only severe hazard affecting the site.

Table 2: Natural Hazards

Hazard	Risk level	Hazard	Risk level
Hurricane	non-existent	Landslide	non-existent
Tornado	medium	Volcanic activity	non-existent
Tsunami	non-existent	Animals	very low
Flood	very low	Other	none
Earthquake	very low		

b. Description and possible countermeasures:

(1) Potential safety issues on human activities in the surrounding areas: The site will have an intrusion detection system at the facility. There is a minimum risk associated with civilian air traffic near the facility, mainly from crop duster aircraft.

(2) Potential terrain issues: None

9. Environmental issues

There are no other environmental issues.

10. Radiological information

a. Average and seasonal range of Pb-212 airborne concentration (μBq./SCM): The average Pb-212 concentration was 4.430 μBq./SCM. Insufficient data exist to provide seasonal range information. The average readings were based on daily measurements for 3 consecutive days in October 1998.
b. Average and seasonal range of Be-7 airborne concentration (μBq./SCM): The average Be-7 concentration was 2.797 μBq./SCM. Insufficient data exist to provide seasonal range information. The average readings were based on daily measurements for 3 consecutive days in October 1998.
c. Average and seasonal range of Cs-137 airborne concentration (μBq./m^3): No Cs-137 data was available.
d. Average and seasonal range of Pb-210 airborne concentration (μBq./m^3): No Pb-210 data was available.
e. Other natural and/or anthropogenic radionuclides: Other natural and/or anthropogenic isotopes that were measured are shown on page 7 in Table 3 and Figure 1.

f. Nearby nuclear power plants: The closest nuclear power plant is at Wolf Creek. This site is a 1.2 MW pressurized water reactor and is located near Burlington, Kansas. The plant is located over 380 km northeast of Ashland.
g. Nearby plants where radioisotopes are used or produced: The nearest research reactor is a 250 kW Triga-type reactor operated by Kansas State University in Manhattan, Kansas. This reactor is located approximately 360 km northeast of the site.
h. Constant and episodic anthropogenic sources of radionuclides: Isotopes observed after not being detected in the ambient background include Cs-137 (all 6), Bi-211 (11, 12, 15), Bi-212 (all but 14), Pb-214 (13, 16), Ra-224 (all but 14), Ac-228 (11, 12, 14, 15), Th-228 (14), Th-231(11), and Pa-234m (14). Of these, Cs-137 is the only one not part of a natural process or natural decay chain. The Cs-137 is likely a remnant of the Chernobyl accident and atmospheric nuclear testing. The remainder of the isotopes observed were simply present in the air and soil samples in higher concentrations than what occurs in the counting room background. These isotopes (K-40, Bi-211, Bi-212, Pb-212, Bi-214, Pb-214, Ra-226, Ac-228, Th-228, Th-231, Th-234, and U-235) are naturally occurring and/or are part of natural decay chains. There are no other known sources of radionuclides within 300 km.
i. Other potential man-made radioactive sources: There is one hospital in Dodge City 65 km north of the site with a nuclear medicine department that possibly produces detectable radionuclide isotopes (iodine, radium, technetium, barium and thallium).
j. Elevated natural radiation sources: No other natural radiation sources were observed.
k. Other: N/A
l. Recency of above data: October 5, 1998

11. Schedule and measurements

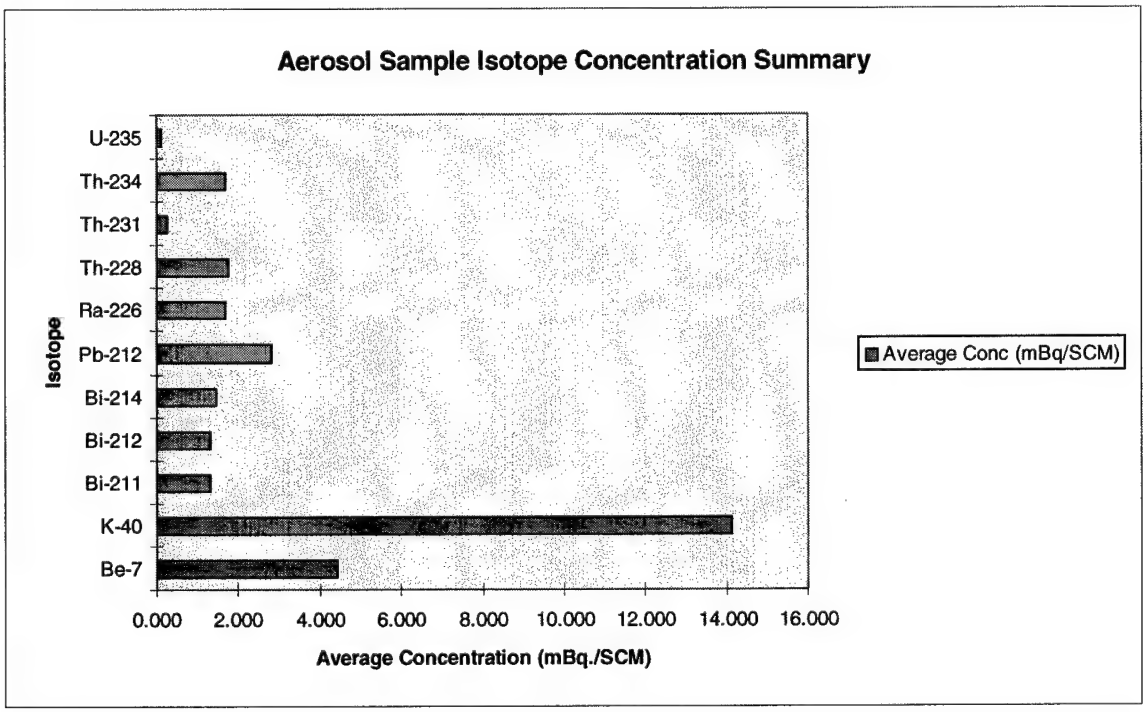
a. Period of the on-site survey: The air sample survey was conducted between October 20-22, 1998. The soil samples were obtained on May 28, 1998.
b. Dose rate measurements: Not applicable
c. In-situ gamma spectrometry: Not applicable
d. Aerosol filter measurement: Eleven isotopes were sampled during air filter measurement. The filters were exposed for a duration of 24 hours each on three consecutive days. Soon after each filter was extracted, it was to be sent via overnight shipment to the McClellan Central Laboratory. However, due to the relatively isolated area of the site, the best option for shipment was two-day "Express Mail." Consequently, the first sample was extracted from the unit on October 20 and arrived at the lab on the 22nd. Because of further difficulties with deliveries on Friday the 23rd, and with no weekend delivery, the final two filters (extracted on October 21 and 22) did not reach the lab until Monday the 26th. These delays did affect the assay results. Table 3 and Figure 1 depict summaries of concentration measurements. Due to the delays in filter receipt and the relatively small size of the filters themselves, short-lived decay products on the filters were observed at lower levels than usual. Other natural isotopes would probably have been observed if the samples had been assayed within the usual 36 hours.

Aerosol sample concentration measurements are shown in Table 3 and in Figure 1.

Table 3: Summary of Aerosol Sample Measurement Concentrations

Nuclide	Average Concentration (mBq./SCM)	Average % Error	Standard Deviation (mBq./SCM)
Be-7	4.430	27.8	1.07
K-40	14.123	190.7	21.44
Bi-211	1.306	106.5	1.03
Bi-212	1.321	37.6	0.18
Bi-214	1.459	34.1	1.20
Pb-212	2.797	40.8	4.05
Ra-226	1.703	475.3	N/A
Th-228	1.757	2378.4	2.27
Th-231	0.258	9056.0	0.36
Th-234	1.681	279.3	0.88
U-235	0.119	319.3	0.03

Figure 1: Aerosol Sample Isotope Concentration Summary Graph



e. Soil/rock samples: The isotopes found during soil sampling and their concentrations are depicted in Tables 4 and 5 and in Figure 2.

Table 4: Soil Sample Isotope Measurements

Sample #	1		2		3		4		5		6	
Isotope	Conc (mBq/ gm)	% Error	Conc (mBq/ gm)	% Error	Conc (mBq/ gm)	% Error	Conc (mBq/ gm)	% Error	Conc (mBq/ gm)	% Error	Conc (mBq/ gm)	% Error
K-40	397.09	70.9	486.55	5.1	426.19	5.2	418.63	7.2	402.82	6.6	514.31	4.0
Cs-137	6.63	14.2	5.61	12.2	4.30	13.7	2.72	26.5	5.74	13.4	7.76	8.0
Bi-211	8.71	102.2	30.9	20.1	6.45	86.1			20.15	36.3	5.52	89.8
Bi-212	21.15	27.4	16.24	24.8	18.22	22.1			16.58	30.9	19.68	16.0
Pb-212	23.48	6.5	24.45	4.8	17.08	5.4	20.77	7.0	20.42	6.3	20.43	4.0
Bi-214	16.57	13.0	17.68	9.1	11.93	12.8	15.86	13.4	14.80	12.4	14.50	8.9
Pb-214	12.82	19.7	10.76	15.6	10.79	124.4	14.46	11.5	12.37	16.4	13.18	9.3
Ra-224	35.96	23.8	36.38	15.9	19.43	22.6			27.75	23.7	13.87	27.1
Ac-228	24.34	9.3	27.14	6.0	16.76	10.4	41.04	2.6	26.00	7.6	18.36	7.3
Th-228			19.49	468.9	44.11	39.8	128.66	15.9	58.16	40.2	37.97	35.6
Pa-234m							156.37	82.9				
Th-231	17.73	17.4										
Th-234	21.79	69.8	15.57	59.5	20.10	36.2	15.10	100.9	83.62	9.5	15.34	35.9
U-235	4.63	23.6	3.64	19.9	2.11	28.8	3.17	33.6	2.82	29.1	1.79	26.1

Table 5: Soil Sample Isotope Average Concentrations

Isotope	Average (mBq/gm)	Standard Deviation	% Standard Deviation
K-40	440.93	48.074	10.9%
Cs-137	5.46	1.769	32.4%
Bi-211	14.35	10.952	76.3%
Bi-212	18.37	2.075	11.3%
Pb-212	21.11	2.611	12.4%
Bi-214	15.22	1.990	13.1%
Pb-214	12.40	1.436	11.6%
Ra-224	26.68	9.975	37.4%
Ac-228	25.61	8.640	33.7%
Th-228	57.68	42.042	72.9%
Pa-234m	156.37		
Th-231	17.73		
Th-234	28.59	27.106	94.8%
U-235	3.02	1.038	34.3%

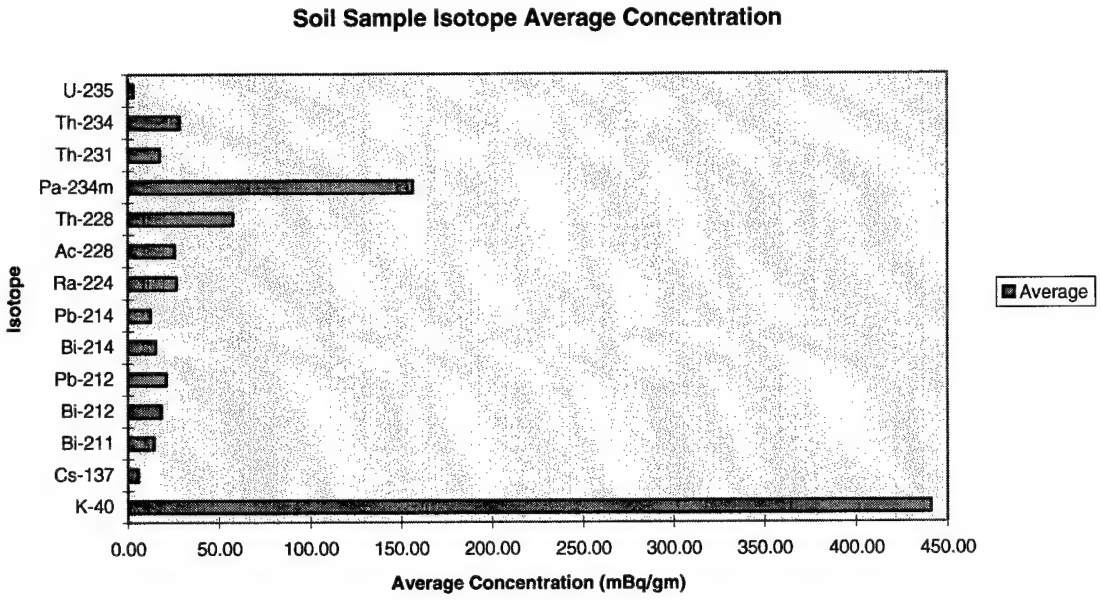


Figure 2: Soil Sample Isotope Average Concentration Graph

12. Observations, reasonings, discussion, and recommendations

a. Air flow decoupling at site: Air flow decoupling rarely occurs at the site. See Annex D for detailed decoupling data.

b. Microclimate conditions at site: The microclimate conditions are described as semi-arid plains.

c. Infrastructure: There is no current infrastructure at the site. Construction of a concrete pad, installation of electrical power and telephone service to the pad location, and construction of a pre-fabricated building to prevent weather damage and unauthorized entry are necessary prior to installation of the sampler.

d. Background radioactivity (natural/anthropogenic): All known natural and anthropogenic radionuclide sources have been identified and are not considered significant.

e. Communications (proposed locations of VSAT antenna, host country communication regulations, etc.): Communication is by commercial telephone line.

f. Final evaluation: This location is expected to fulfill IMS requirements.

Annex A: Local and General Siting Maps of Ashland, Kansas

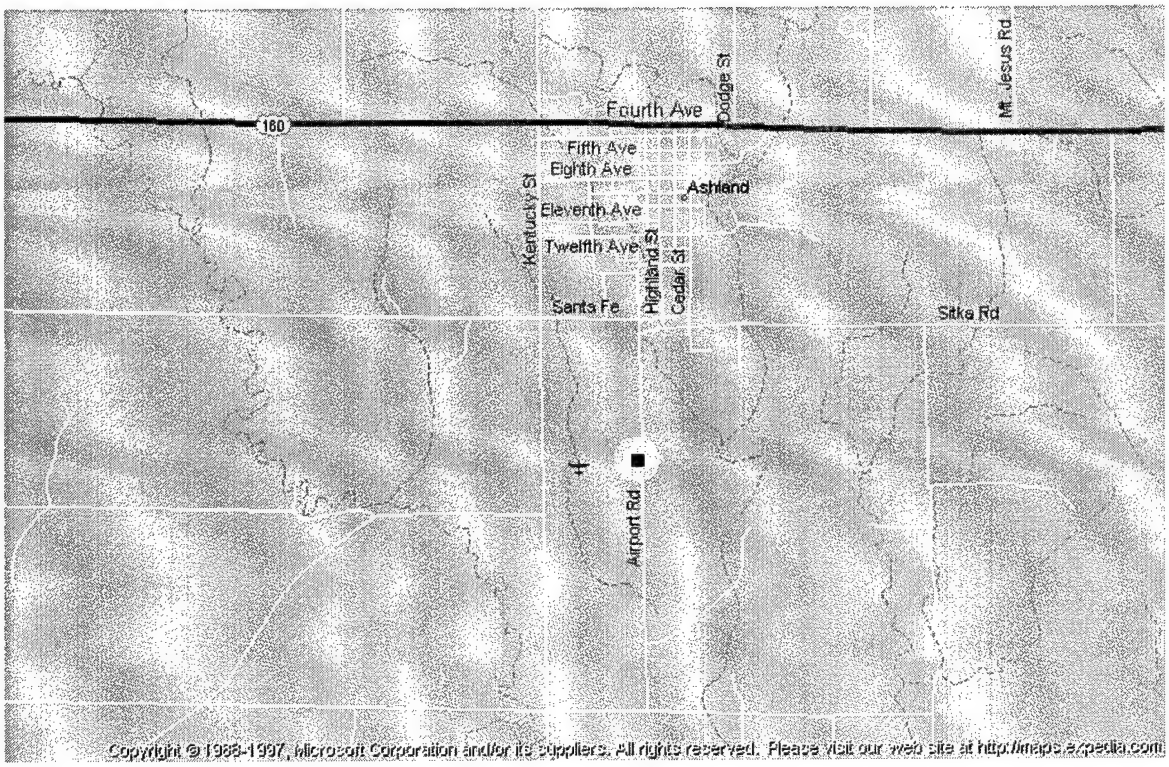


Figure A-1: Site Map

Annex A: Local and General Siting Maps (continued)

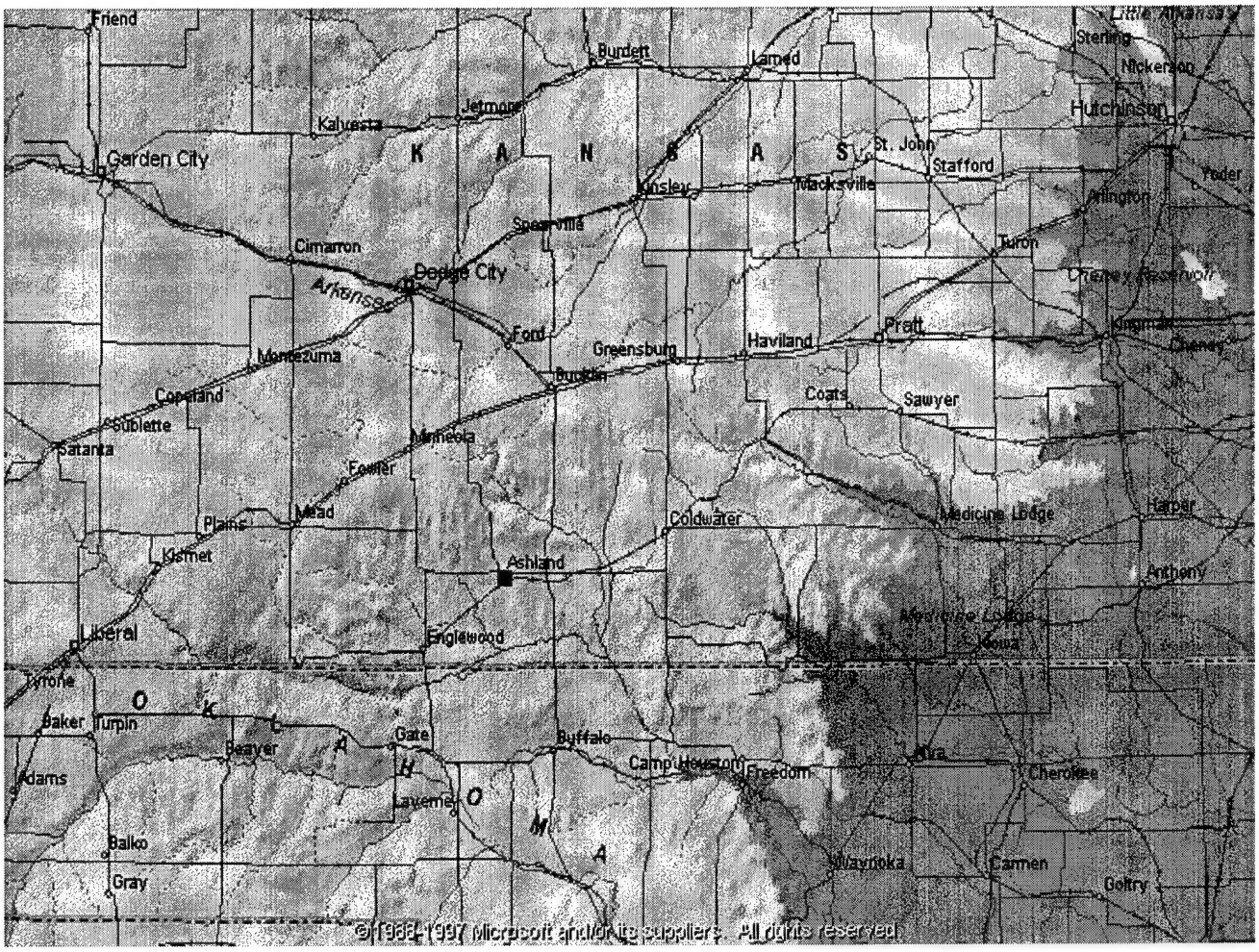


Figure A-2: Local Area Map

Annex B: Site Photographs

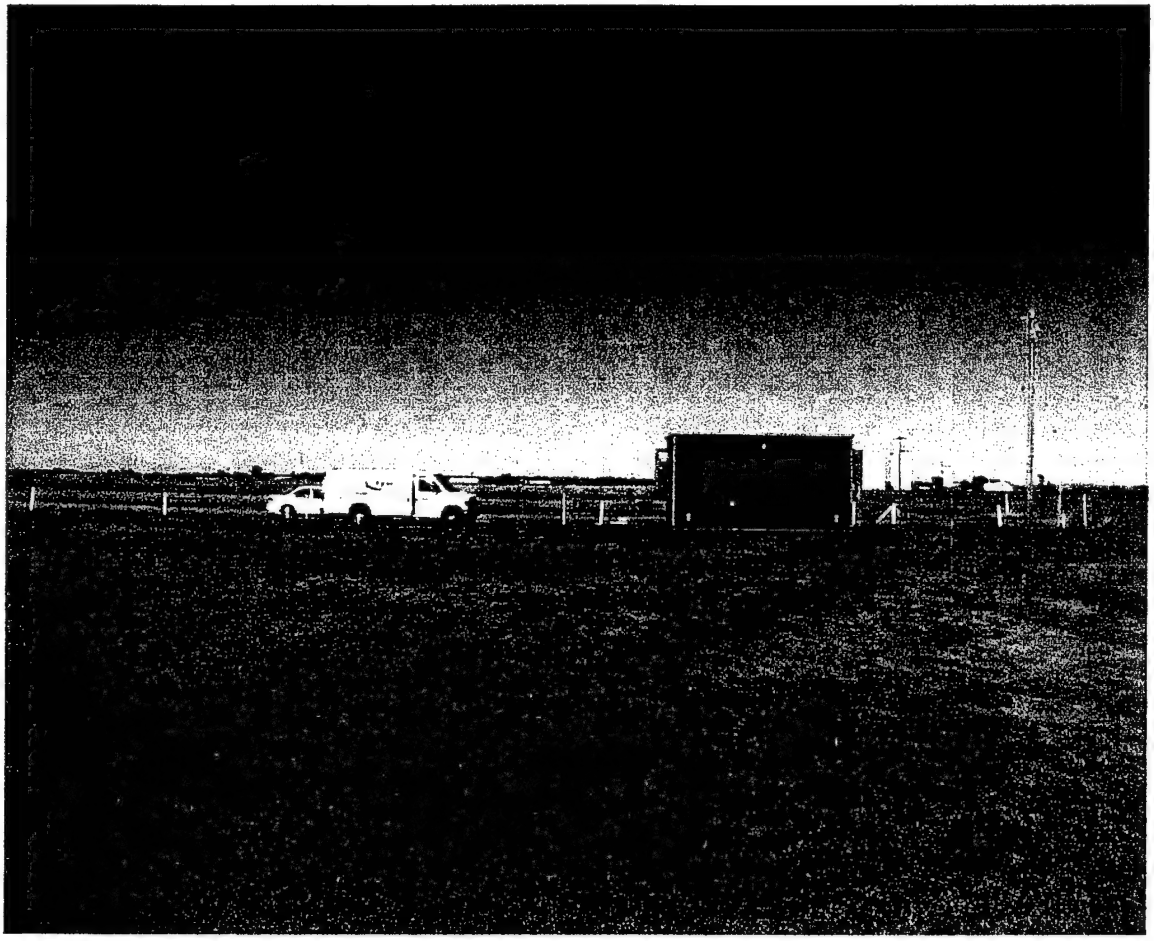


Figure B-1: View from Site to North

Annex B: Site Photographs (continued)

Figure B-2: View from Site to East

Annex B: Site Photographs (continued)

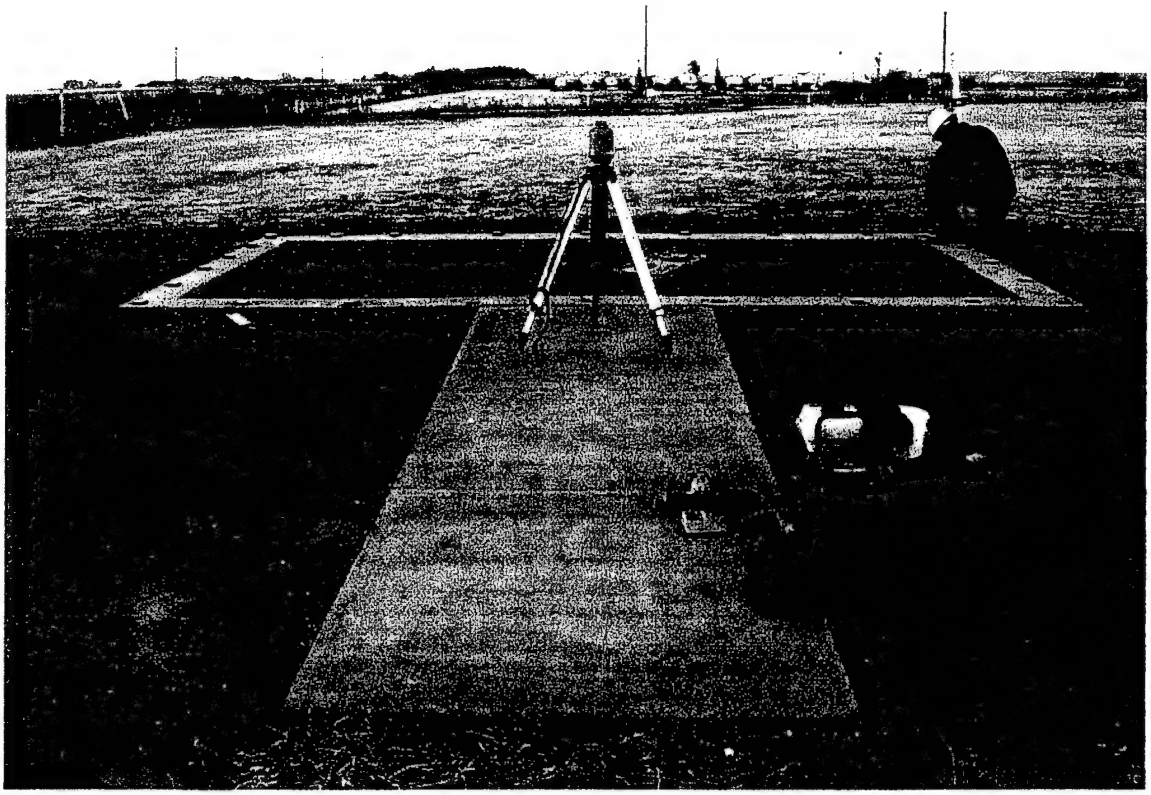


Figure B-3: View from Site to South

Note: Photo taken before installation of building

Annex B: Site Photographs (continued)

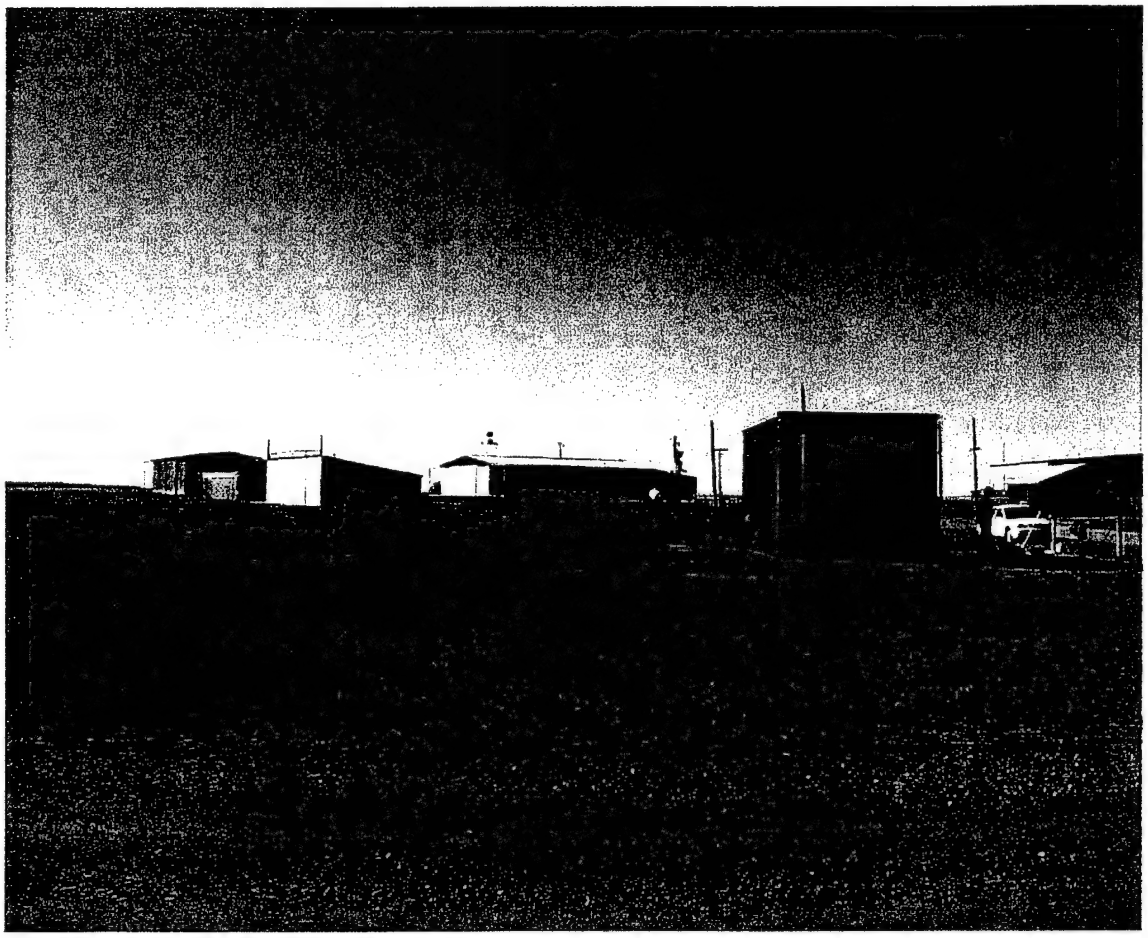


Figure B-4: View from Site to West

Annex C: Annual Meteorological Graphs

Yearly graphs of wind speed, temperature, snowfall and precipitation

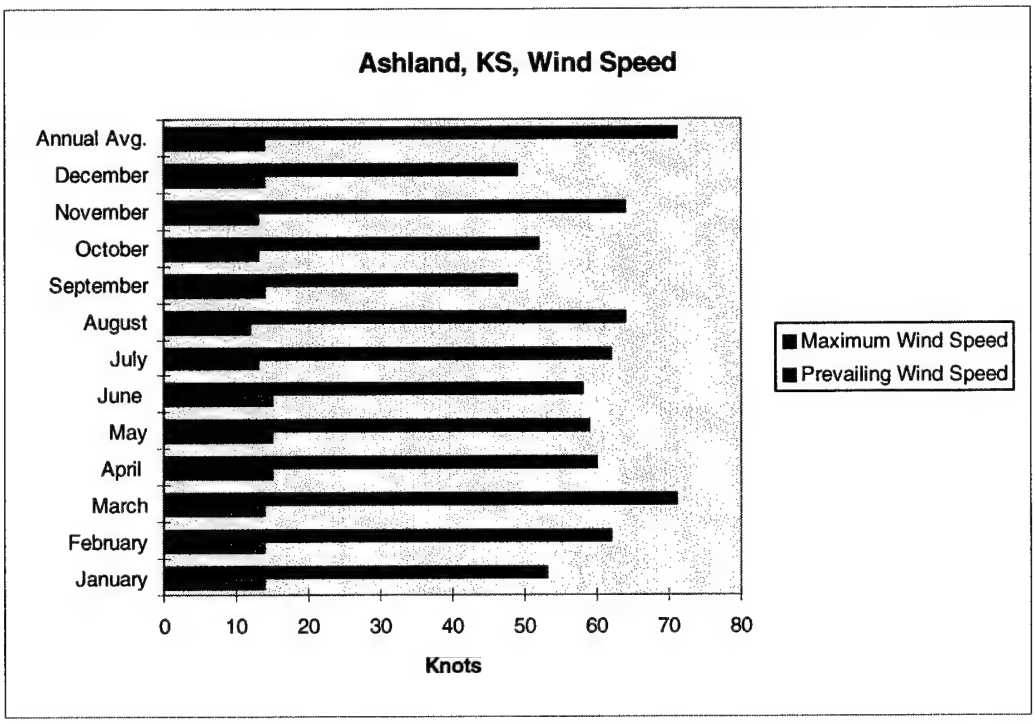


Figure C-1: Annual Wind Speed Graph

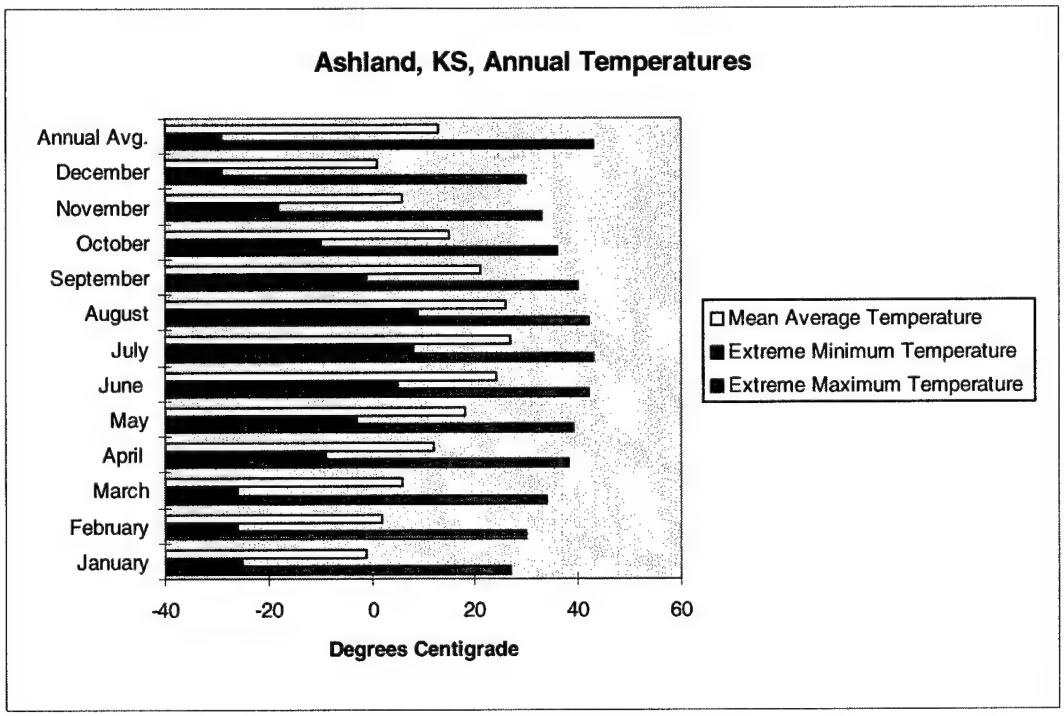


Figure C-2: Annual Temperature Graph

Annex C: Annual Meteorological Graphs (continued)

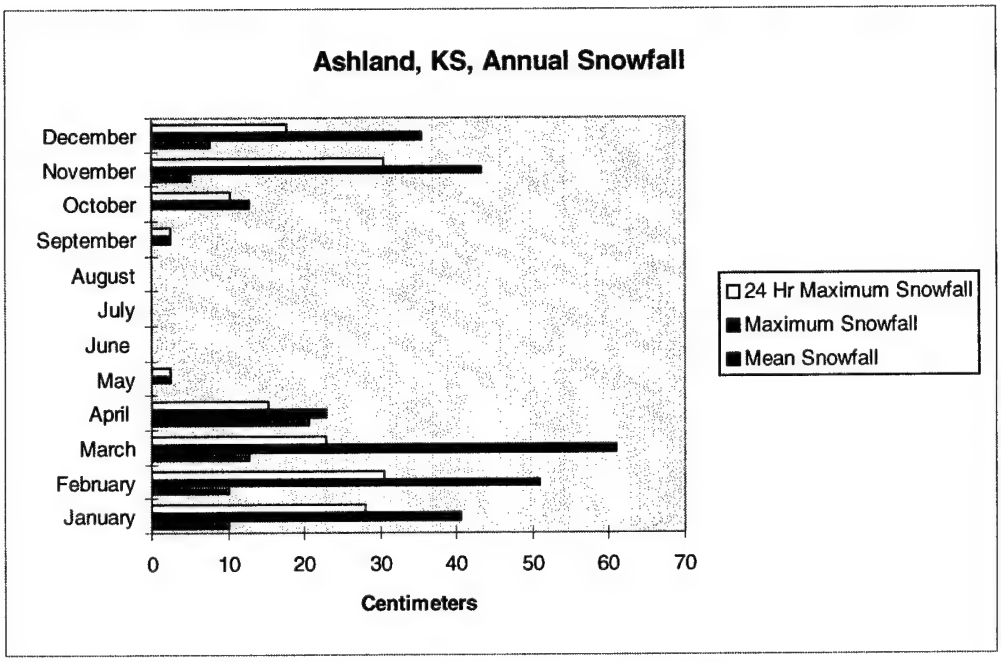


Figure C-3: Annual Snowfall Graph

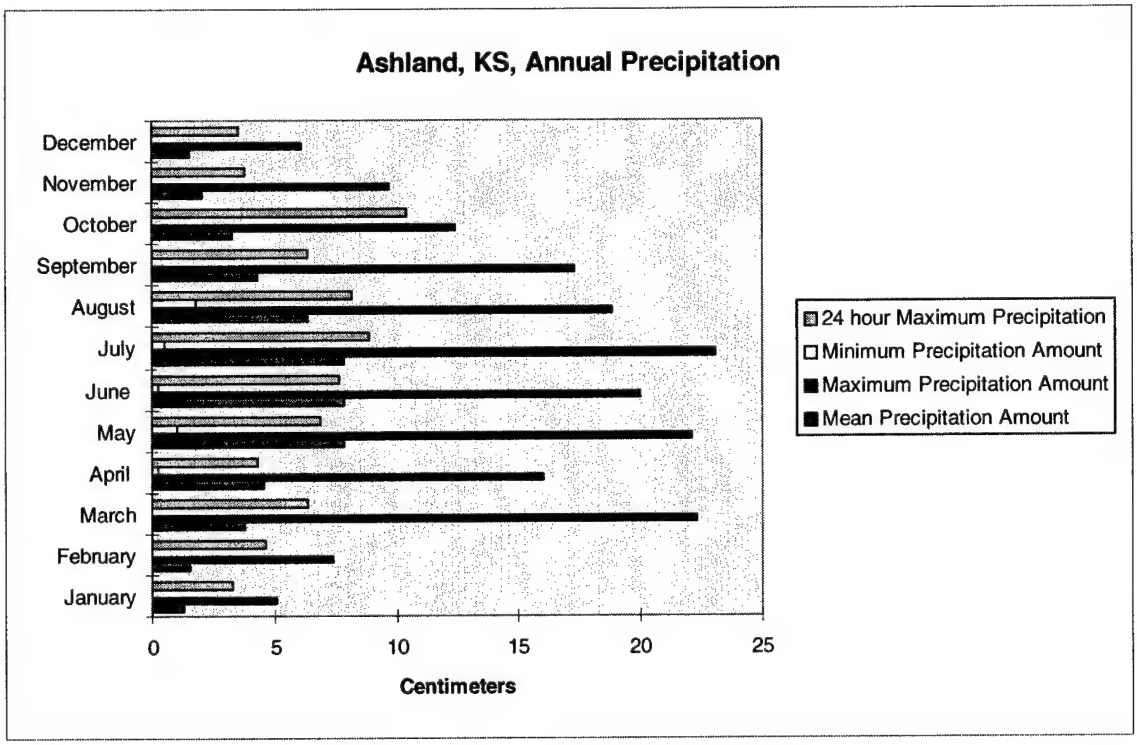


Figure C-4: Annual Precipitation Graph

Annex D: Decoupling Report

Meteorological data/report that attests that the site survey area is not decoupled from the upper airflow for a period greater than 24 hours.

The average decoupling estimate is based on the climatological record of the Pasquill-Gifford stability classes for the site, where D is neutral, A is very unstable and G is very stable. To estimate the site decoupling, percentage of time the site experienced Pasquill-Gifford stability classes of F and G was summed. These are defined as stable conditions for F and extremely stable for G. The underlying assumption is that decoupling will only occur when the atmosphere is stable. These two stability classes can only occur at night, with wind speeds less than 3 meters/second, and less than half the sky can have clouds. Data are based on hourly surface observations taken at each station.

The observation site, the Dodge City National Weather Service Office, is approximately 50 km north of the proposed radionuclide station, but provides an accurate representation of the Ashland climatology. The F and G conditions generally do not last for more than 2-3 hours during a specific day at Ashland. Therefore, the Ashland sampling site is not decoupled from the upper atmosphere for periods exceeding 24 hours.

Period of Record: 1973-1997
# of Observations: 232,326
Source: NWS Dodge City, KS

% Frequency of Occurrence
Stability Indices for Ashland, Kansas

Table D-1: Decoupling Frequency of Occurrence

Stability Index	% Freq of Occurrence	# of Observations	Stability Index	% Freq of Occurrence	# of Observations
Jan F&G	4.80%	846	Jul F&G	5.80%	1023
Feb F&G	5.47%	880	Aug F&G	6.15%	1114
Mar F&G	4.09%	729	Sep F&G	6.12%	1072
Apr F&G	3.73%	654	Oct F&G	7.82%	1406
May F&G	3.84%	712	Nov F&G	6.00%	1031
Jun F&G	4.44%	750	Dec F&G	6.23%	1111

Annex E: Local Weather Conditions

Meteorological report by experts on local weather conditions (local air flow)

Forty -seven year meteorological report
(Jan 48-Dec 95)

Table E-1: Meteorological Data Summary of Local Conditions

	Mn Max Tmp	Mn Min Tmp	Mn Avg Tmp	Ext Max Tmp	Ext Min Tmp	Mn Pcp Amt	Max Pcp Amt	Min Pcp Amt	24hr Max Pcp	Prev Wnd Dir	Prev Wnd Spd	Max Wnd Gust	Mn Snw Fall	Max Snw Fall	24hr Max Snw
Jan	6	-8	-1	27	-25	1.27	5.08	0	3.30	N	14	53	10.1	40.6	27.9
Feb	9	-5	2	30	-26	1.52	7.36	T	4.60	N	14	62	10.1	50.8	30.5
Mar	14	-1	6	34	-26	3.81	22.3	T	6.35	S	14	71	12.7	60.9	22.9
Apr	20	5	12	38	-9	4.57	16.0	0. 25	4.32	S	15	60	20.5	22.8	15.2
May	25	11	18	39	-3	7.87	22.1	1.01	6.86	S	15	59	T	2.54	2.54
Jun	31	17	24	42	5	7.87	20.0	0.25	7.62	S	15	58	0	0	0
Jul	34	20	27	43	8	7.87	23.1	0.50	8.90	S	13	62	0	0	0
Aug	33	19	26	42	9	6.35	18.8	1.78	8.13	S	12	64	0	0	0
Sep	28	14	21	40	-1	4.31	17.3	T	6.35	S	14	49	T	2.54	2.54
Oct	22	7	15	36	-10	3.30	12.4	T	10.40	S	13	52	T	12.7	10.2
Nov	13	-1	6	33	-18	2.03	9.7	T	3.80	S	13	64	5.08	43.2	30.5
Dec	7	-5	1	30	-29	1.52	6.1	T	3.56	N	14	49	7.62	35.4	17.8
Ann	20	6	13	43	-29	52.3	83.3	25.4	10.4	S	14	71	50.8	114	30.5

Data listed in Table E-1 are measured in degrees Centigrade, centimeters of precipitation and knots of wind speed.

Annex F: Experimental Air Sampler Raw Data

Aerosol Sample Collection/Measurement Information **Ashland, Kansas**

Table F-1: Aerosol Sample Collection/Measurement Information

#	Collection Start	Collection Stop	Acquisition Start	Volume (SCM)	Nuclide	Conc. (mBq/SCM)	% Error	ID Confidence
1	19-Oct-98	20-Oct-98	22-Oct-98	86.4	Be-7	5.579	23.4	1
					K-40	38.879	13.5	0.998
					Bi-211	2.032	38.1	0.286
					Bi-212	1.452	20.8	0.581
					Pb-212	7.475	5.0	0.946
					Ra-226	1.703	475.3	0.964
					Th-234	0.905	481.7	0.472
					U-235	0.099	480.3	0.709
#	Collection Start	Collection Stop	Acquisition Start	Volume (SCM)	Nuclide	Conc. (mBq/SCM)	% Error	ID Confidence
2	20-Oct-98	21-Oct-98	26-Oct-98	86.4	Be-7	4.253	26.1	0.997
					K-40	1.729	294.8	0.986
					Bi-212	1.191	54.3	0.561
					Pb-212	0.380	74.0	0.395
					Bi-214	0.610	57.5	0.566
					Th-228	3.360	234.1	0.567
					Th-231	0.511	242.4	0.707
					Th-234	2.633	124.0	0.487
					U-235	0.139	158.4	0.492
#	Collection Start	Collection Stop	Acquisition Start	Volume (SCM)	Nuclide	Conc. (mBq/SCM)	% Error	ID Confidence
3	21-Oct-98	22-Oct-98	26-Oct-98	86.4	Be-7	3.457	33.9	1
					K-40	1.761	263.9	0.997
					Bi-211	0.580	174.9	0.401
					Pb-212	0.535	43.3	0.752
					Bi-214	2.308	10.6	0.434
					Th-228	0.154	4522.8	0.571
					Th-231	0.006	17869.5	0.716
					Th-234	1.504	232.1	0.488

Annex G: Airborne Radionuclide Concentration Annual Graphs

This information was not available due to the short sampling period.

Annex H: Topographic Map

Topographic map of Ashland, Kansas, and central region of the United States

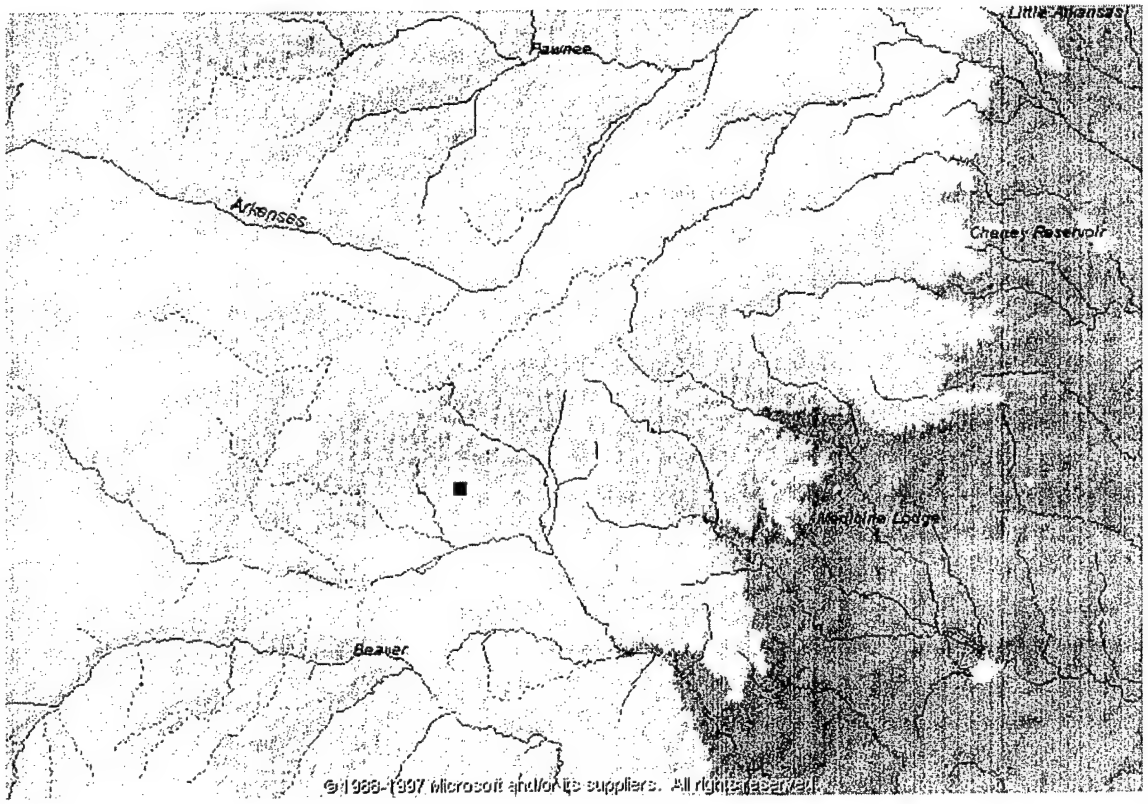


Figure H-1: Topographic Map of Ashland, Kansas, and Western Kansas

Annex I: Tectonic Area Map

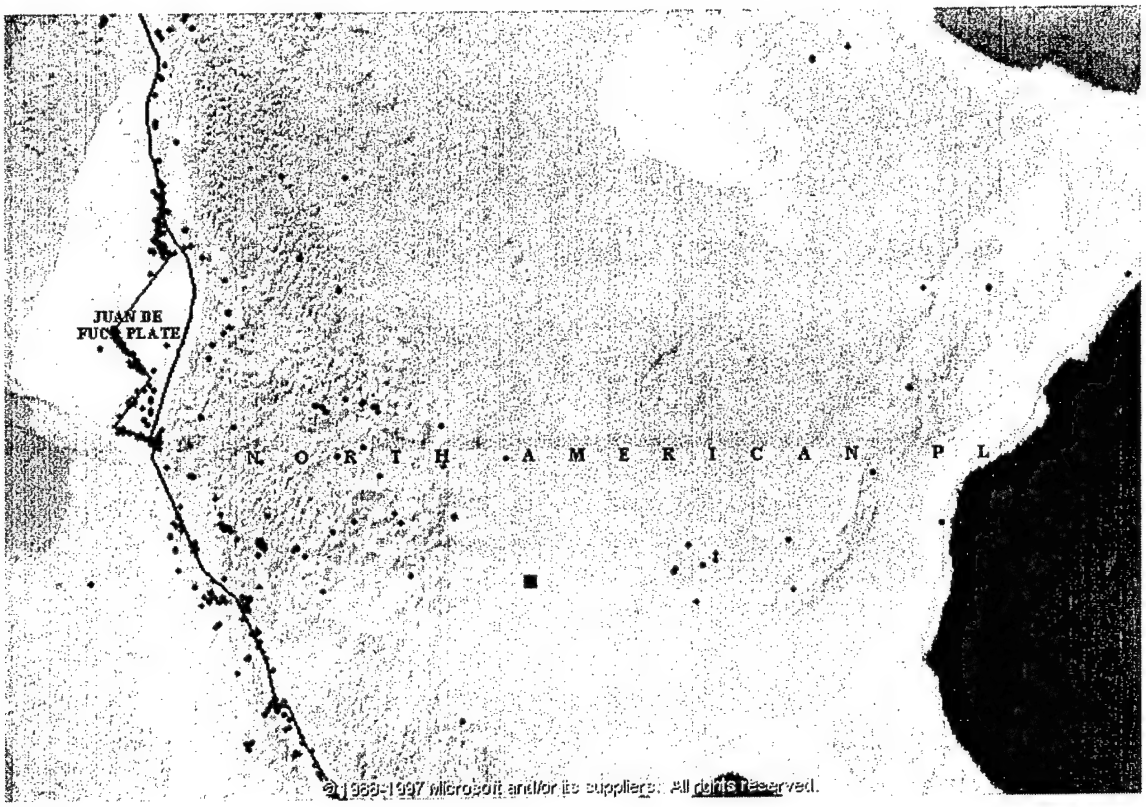


Figure I-1: Tectonic Map of West Central United States

Annex J: Hazard Map of Region

Tornadoes are the only hazard rated medium threat level or higher. No hazard maps for tornadoes are available.

Annex K: Airborne Gamma Spectrometry Map

This information is not applicable.

Annex L: Equipment Used During Site Survey

List of equipment used (with technical specifications and manufacturer) during the site survey

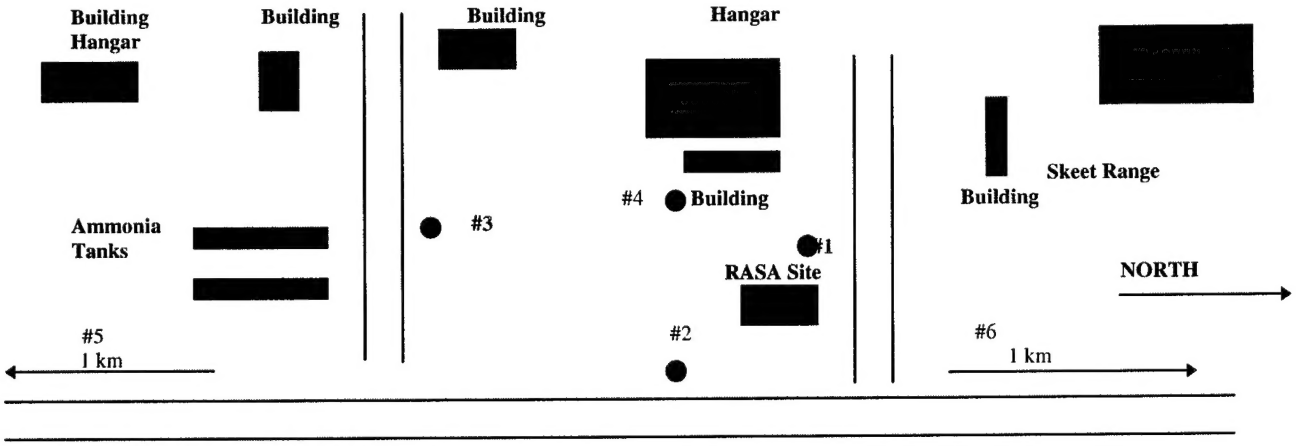
Global Positioning Satellite Receiver

Model: Garmin GPS 12XL
Certificate: FCC ID JPH-17800
Manufacturer: Garmin
Olathe, Kansas, USA

Annex M: Equipment Used for Air Sampling and Soil/Rock Samples

List of equipment used (with technical specifications and manufacturer) for the filter used during the on-site survey and the soil/rock samples

Soil/Rock Samples: Four soil samples were collected from within a few hundred yards of the proposed RASA sampler site. Two more samples were collected from 1-3 kilometers upwind from the site. Samples were scooped into plastic vials after loose dust was brushed away from the soil surface. About 25 cm^3 of soil was contained in each vial. A map was sketched of the sample area, with all sampling sites marked. Labels were applied to each vial corresponding with sites on the sketch (Figure M-1 below). Vials were then placed in a sealable plastic bag and mailed to the laboratory.



#1 N37.16700/W 99.7691
#2 N37.16701/W99.76893
#3 N37.16649/W99.76965
#4 N37.16699/W99.77040
#5 N37.15561/W99.76870
#6 N37.17811/W99.77021

Figure M-1: Soil Sample Site Map

Air Samples: The survey air samples were collected by an EBERLINE Regulated Air Sampler, model RAS-1, manufactured by Eberline Instrument Corporation, Santa Fe, New Mexico. The sampler was powered by a GAST air pump, model 0523-U1138Q-G582DX, manufactured by Gast Manufacturing Corporation, Benton Harbor, Michigan.

Annex N: Daily Activity Log

Log of overall daily activities during the site survey

Sequence of Events:

May 28, 1998	Soil samples taken and submitted for analysis per 29 April 1998 instructions and kit developed by McClellan Central Laboratory, McClellan AFB, CA.
October 20-22, 1998	Air filter samples taken.
September 1 - December 10, 1998	Meteorological and background data collated and compiled.
December 15, 1998	Site survey report completed.

Annex O: Personnel List

List of the scientific and/or technical people who participated in the survey process (with phone number, fax and E-mail).

Maurice McKethan, Host Survey Technician (407) 494-3741

John Lucas, Program Manager (407) 494-7594 (Phone)
(407) 494-5460 (Fax)
johnl@aftac.gov (E-mail)

Distribution List:

OSD/NTP	(2)
DTRA/OST	(1)
AFTAC/RM	(3)
AFTAC/CAS	(1)
AFTAC/LSCLM	(6)
AFTAC/TMSW	(1)
ASC Det 3	(1)
CTI	(1)